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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/851,387	05/09/2001	Mitsuhiko Nada	205002US2	3902
22850	7590	01/23/2003		
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER	
			VERBITSKY, GAIL KAPLAN	
			ART UNIT	PAPER NUMBER
			2859	

DATE MAILED: 01/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

MP

<b>Office Action Summary</b>	Application No. <b>09/851,387</b>	Applicant(s) <b>Nada</b>
	Examiner <b>Gail Verbitsky</b>	Art Unit <b>2859</b>



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1)  Responsive to communication(s) filed on Dec 19, 2002
- 2a)  This action is FINAL.      2b)  This action is non-final.
- 3)  Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.
- 4)  Claim(s) 1-3, 7-9, and 14 is/are pending in the application.
- 4a) Of the above, claim(s) 4-6, 11-13 is/are withdrawn from consideration.
- 5)  Claim(s) \_\_\_\_\_ is/are allowed.
- 6)  Claim(s) 1-3, 7-9, and 14<sup>10</sup> is/are rejected.
- 7)  Claim(s) \_\_\_\_\_ is/are objected to.
- 8)  Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9)  The specification is objected to by the Examiner.
- 10)  The drawing(s) filed on \_\_\_\_\_ is/are  accepted or  objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11)  The proposed drawing correction filed on \_\_\_\_\_ is:  approved  disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12)  The oath or declaration is objected to by the Examiner.

#### Priority under 35 U.S.C. §§ 119 and 120

- 13)  Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a)  All b)  Some\* c)  None of:  
1.  Certified copies of the priority documents have been received.  
2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3.  Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\*See the attached detailed Office action for a list of the certified copies not received.

- 14)  Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).  
a)  The translation of the foreign language provisional application has been received.
- 15)  Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

#### Attachment(s)

- 1)  Notice of References Cited (PTO-892)
- 2)  Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3)  Information Disclosure Statement(s) (PTO-1449) Paper No(s). 35
- 4)  Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5)  Notice of Informal Patent Application (PTO-152)
- 6)  Other: \_\_\_\_\_

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### **DETAILED ACTION**

1. Applicant's election of Species A (Claims 1-3, 7-10, 14) with traverse is hereby acknowledged. Applicant states that a search for elected species will also necessarily require a search for other species. Examiner respectfully disagrees with this statement, because a search required for the elected species (power semiconductor/ coolant) does not require a search in the area of electrical motors, as required by non-elected claims. Therefore, restriction/ election requirement is proper and thereby, made FINAL.

#### ***Priority***

2 Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119 (a)-(d).

#### ***Claim Rejections - 35 USC § 102***

3 The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-3 are rejected under 35 U.S.C. 102(b) as being anticipated by Mori et al. (U.S. 5778662) [hereinafter Mori].

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Mori discloses a device and a method of determining (estimating) temperature, the device comprises of a first object/ component (coolant/ heat sink), a second object/ component (power semiconductor/ transistor), wherein, before energization, both objects temperatures are equalized by the coolant. The method comprises determining of the temperature of the coolant  $T_s$  ( $T_2$ ). The computer adds the  $T_s$  ( $T_2$ ) and  $T_{ds}$  ( $\Delta T$ ) which is the difference in temperatures between the coolant and the transistor. Inherently, that the both objects are positioned relatively close to each other and that in absence of a heat generation (energization) their temperatures equalize.

Inherently, the temperature difference is related (characterizes) the amount of heat (energization) needed to energize (turn in) the transistor.

With respect to claims 1-3: the method steps will be met during the normal operation of the device stated above.

5. Claims 1-3 are rejected under 35 U.S.C. 102(b) as being anticipated by Takeda (U.S. 5923135).

Takeda discloses a device and a method of determining (estimating) temperature, the device comprises a first object/ component (coolant), a second object/ component (power semiconductor), wherein, before energization, both objects temperatures are equalized by the coolant. The coolant temperature  $T_c$  ( $T_2$ ) is being detected by a temperature sensor 14. A temperature of the semiconductor (junction) is being determined by a formula  $T_j = P \cdot 01 + T_c$ , wherein,  $P \cdot 01$  ( $\Delta T$  or increment) indicates the amount of energization needed for junction

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(specific value). It is inherent that  $\Delta T$  should be determined prior to incorporating it into the formula shown above. There is an estimator to estimate the junction ( $T_1$ ) temperature.

With respect to claims 1-3: the method steps will be met during the normal operation of the device stated above.

6. Claims 1-3, 8 are rejected under 35 U.S.C. 102(b) as being anticipated by DE 19852080 C1 {hereinafter DE}.

DE discloses a device and method comprising a first object (coolant) a second object (power semiconductor) wherein, when a temperature of equilibrium between the coolant and the semiconductor is reached, a temperature of the coolant  $T_m$  ( $T_1$ ) is measured. A temperature of the semiconductor  $T_2$  is determined by adding a temperature difference value ( $\Delta T$ ) to the detected temperature  $T_1$  of the coolant. The temperature difference (specific value) is computed using pre-existing relationship between a power loss and difference after a change in a power loss (energization). DE determines the temperature of the coolant at a detection point that reaches equilibrium temperature after a change in power loss, thus, in a state when the power semiconductor is not energized. Furthermore, it is inherent that power semiconductors response more rapid (junction) to a heat change than a coolant.

With respect to claims 1-3: the method steps will be met during the normal operation of the device stated above.

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***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 7-9 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over DE in view of Eisenhardt et al. (U.S. 6348672B2) [hereinafter Eisenhardt].

DE discloses a device and method comprising a first object (coolant) a second object (power semiconductor) wherein, when a temperature of equilibrium between the coolant and the semiconductor is reached, a temperature of the coolant  $T_m$  ( $T_1$ ) is measured. A temperature of the semiconductor  $T_2$  is determined by adding a temperature difference value ( $\Delta T$ ) to the detected temperature  $T_1$  of the coolant. The temperature difference (specific value) is computed using pre-existing relationship between a power loss and difference after a change in a power loss (energization). DE determines the temperature of the coolant at a detection point that reaches equilibrium temperature after a change in power loss, thus, in a state when the power semiconductor is not energized. Inherently, a determination (estimation portions) to determine the temperature of the coolant  $T_2$  should be present in the device. It is also inherent, that both objects are positioned relatively close to each other, so as the coolant could cool the power

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semiconductor. Furthermore, it is inherent that power semiconductors response more rapid (junction) to a heat change than a coolant.

DE does not explicitly teach measuring the temperature of the power semiconductor, as stated in claim 7, and a temperature determination portion and an estimation portion, as stated in claim 14.

Eisenhardt discloses a device comprising a first object (coolant) to cool a second object (power semiconductor) wherein the power semiconductor temperature is being measured by a temperature sensor (temperature determination portion) integrated (installed) in the power semiconductor.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to integrate a temperature sensor in a power semiconductor of DE, as taught by Eisenhardt, so as to obtain instantaneous temperature measurement of the power semiconductor, in order to allow the operator to take immediate necessary actions if the power semiconductor fails.

### *Conclusion*

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art cited in the PTO-892 and not mentioned above disclose related devices and methods.

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10. Any inquiry concerning this communication should be directed to Examiner Verbitsky who can be reached at (703) 306-5473 Monday through Friday 7:30 to 4:00 ET.

Any inquiry of general nature should be directed to the Group Receptionist whose telephone number is (703) 308-0956.

GKV

January 06, 2002



*Gail Verbitsky, Patent Examiner, TC 2800*